DOCUMENT RESUME

ED 101 384 CS 500 943

AUTHOR Chartier, Myron R.
TITLE Simulation Games as Learning Devices: A Summary of Empirical Findings and Their Implications for the Utilization of Games in Instruction.
PUB DATE 73
NOTE 28p.; Paper prepared for Workshop on Simulation Games, American Baptist Seminary of the West and Holy Names College, Fall, 1973

EDRS PRICE MF-$0.76 HC-$1.95 PLUS POSTAGE
DESCRIPTORS *Communication (Thought Transfer); *Educational Games; Educational Research; Literature Reviews; *Simulation; *Speech Education; Teaching Techniques

ABSTRACT

Simulation games have taken their place in many speech-communication curriculums. This article summarizes the research findings related to simulation games as learning devices according to the general impact of games, the differential impact of games, learning effects related to game variables, and learning effects related to combining simulation games with other learning methodologies. The final section provides seventeen practical suggestions for facilitating simulation games that game users among speech communication teachers may find helpful. (Author)

U S DEPARTMENT OF HEALTH
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION
THIS DOCUMENT HAS BEEN REPRO
DUCED EXACTLY AS RECEIVED FROM
THE PERSON OR ORGANIZATION ORIGIN
ATING IT. POINTS OF VIEW OR OPINIONS
STATED DO NOT NECESSARILY REPRE
SENT OFFICIAL NATIONAL INSTITUTE OF
EDUCATION POSITION OR POLICY

ED101384

# SIMULATION GAMES AS LEARNING DEVICES: A SUMMARY OF EMPIRICAL FINDINGS AND THEIR IMPLICATIONS FOR THE UTILIZATION OF GAMES IN INSTRUCTION

Myron R. Chartier
Assistant Professor of Speech Communication
American Baptist Seminary of the West
1300 E. Covina Hills Rd.
Covina, California 91724

Myron R. Chartier

Simulation games have taken their place in many speech-communication curriculums. This article summarizes the research findings related to simulation games as learning devices according to the general impact of games, the differential impact of games, learning effects related to game variables, and learning effects related to combining simulation games with other learning methodologies. The final section provides seventeen practical suggestions for facilitating simulation games that game users among speech communication teachers may find helpful.

CS 500 743

# SIMULATION GAMES AS LEARNING DEVICES: A SUMMARY OF EMPIRICAL FINDINGS AND THEIR IMPLICATIONS FOR THE UTILIZATION OF GAMES IN INSTRUCTION

In recent years there has been a growing interest among teachers of speech communication in the use of simulation games in the classroom. The case for their use in speech communication has been made in articles by both Gorden and Tucker.[1] Recent convention programs of the Speech Communication Association have featured papers on simulation games.[2]

With this rising interest in simulation games for teaching speech communication the question is often asked as to what students learn and how effectively. Can simulation games be taken seriously as educational tools? Or are they merely a means of keeping bored and disinterested students occupied or entertained? Many claims have been made for the educational value of simulation games. Some of these claims are made in the form of hunches; others come in the form of "established" claims.[3]

The purpose of this article is two-fold: 1) to summarize the findings from empirical studies on the learning impact of simulation games and 2) to

provide practical suggestions, based upon these research findings, for the utilization of simulation games in instruction. Any implications for teaching drawn from the research results must be tentative since simulation games have not been systematically compared. There is a large variation in structure, content, objectives, and presentation of games as well as in the measurement of learning effects.

## SUMMARY OF RESEARCH FINDINGS

This paper attempts to summarize the findings from empirical investigations in order to see what is tentatively known about the learning effects of simulation games at what still remains the beginning stages of research development. The data came from research conducted with a wide variety of simulation games. The investigations included populations ranging in age from groups of elementary school children to groups of adults and were conducted in a wide variety of field and experimental settings. The paper contains a discussion of 1) the general impact of games, 2) the differential effects of games, 3) the effects of manipulating game parameters, and finally, 4) results related to combining simulation games with other learning methods.

### The General Impact of Games

Several research studies have observed the general impact of simulation games. The most solid finding is that games generate more interest and motivation than other educational methods. This motivating effect of games has been measured by many researchers.[4] Boocock found that students who played Election Campaign communicated more with friends, parents, and teachers about their classroom experience than did those who merely attended regular classes; the control group's communication actually decreased.[5] Robinson, Anderson, Hermann, and Snyder found that case studies were more successful as an educational method with college undergraduates than the Inter-Nation Simulation in

eliciting student interest as measured by students' perceptions; but measures of student behavior, such as amount of reading from books on reserve in the library, visits to the instructor's office, and class attendance, indicated that simulation was more successful than case studies in affecting student interest and involvement.[6] Lee and O'Leary found that there was a marked rise in appreciation for the course "Problems of American Democracy" as a result of playing and discussing the Inter-Nation Simulation. This appreciation was in contrast to the control group. However, there was no generalization of this game experience to an appreciation of a larger institutional context nor to a heightened interest in the field of intern tional relations nor in active intellectual interest in the social studies area.[7] Loewen found that grades in social studies classes improved as a result of using simulation games. The data seem to suggest that simulation provides a strong motivational potential.[8]

Another significant finding related to game impact is that students seem to learn as many facts and principles by participating in a simulation game as they do in more conventional classroom activities.[9] Wing concluded that sixth graders playing computer-based economic games learned faster but no more than students taught by a conventional classroom method.[10] Garvey and Seiler found that undergraduates in the Inter-Nation Simulation learned less than those in a recitation control group.[11] Karweit and Livingstone in a computer game, Surfboard, observed that the three experimental groups did not learn significantly more than the control group.[12] Baker with a Pre-Civil War Simulation reported a significant increase in learning for the simulation group over the "traditional classes."[13] According to Boocock subjects in Life Career Game learned more factual material than subjects in Legislative Game.[14] Lee and O'Leary found that high school students preferred playing the Inter-Nation Simulation to traditional classroom teaching. However, they rated the simulation as relatively

weak, though still superior to the traditional approach, for the learning of specific facts and information. No data were presented to demonstrate the validity of students' subjective attitudes.[15]

The studies on retention of learning from simulation games have been few and the results have been mixed. Wing and Garvey and Seiler found that game subjects retained less knowledge than the subjects who were taught by other educational methods.[16] Baker concluded that game subjects retained more than subjects experiencing a more conventional educational method.[17]

Chartier measured a wide variety of cognitive outcomes with undergraduates playing Generation Gap. He was unable to discern that simulation play was superior to other methodologies in achieving cognitive objectives at the levels of knowledge, comprehension, application, analysis, synthesis, or evaluation.[18]

Schild has contended with regard to simulation games that one of the most important learnings which cannot be achieved with other methods of teaching is the winning strategy.[19] Knowledge of winning strategies has been measured by Boocock, Fletcher, and Inbar.[20] Schild has used mathematical computations from game scor sheets to demonstrate that the game teaches the optimal strategy of Parent-Child.[21] However, simulation games have not been compared with other educational methods in winning strategy research.

Attitude change studies have been conducted by game scholars. Without a control group, DeKock concluded that Sunshine changed the racial attitudes of high school students from intolerance to tolerance.[22] Shifts in political attitudes have been found with different political simulations by Boocock, Cherryholmes, K. C. Cohen, Hart, and Heinkel.[23] The Cherryholmes study was the only one of this latter group that did not have a control condition. In a study with undergraduates using the Inter-Nation Simulation Garvey and Seiler found no significant difference between the simulation and the recitation group. Both groups produced changes in political attitudes.[24] Boocock found that the

Legislative Game and the Life Career Game brought about different attitudinal shifts. The Life Career Game provided more data on the generation of role empathy than did the Legislative Game.[25] Heinkel found significant differences in the degree of polarization of attitudes between groups exposed to NAPOLI and groups which were not.[26] Hart observed no significant difference.[27] Zaltman with Consumer Game was unable to discern changes in attitudes in regard to borrowing even among players who had engaged heavily in this practice during game play.[28] None of these studies attempted to measure the long term effects of the game experience on subjects' attitudes and opinions. In attempting to discern the general effects of playing and discussing the Inter-Nation Simulation upon high school students' beliefs and perceptions about a variety of sociopolitical issues and international affairs, Lee and O'Leary one month later found no measurable changes.[29]

One of the claims made for games is that they teach students how to be more skillful decision makers and problem solvers.[30] The studies that have actually been conducted on this particular learning outcome are few and the results mixed. C. R. Anderson found that business education and general education majors learned the ability to select a credit source better through the Consumer Game than through a traditional teaching method. The behavior of selecting and signing a credit contract with terms and conditions most favorable to the borrower was learned as well but not better through a simulation learning game as opposed to a more conventional classroom approach.[31] Garvey and Seiler concluded that the students gained decision-making and problem-solving skills in the Inter-Nation Simulation as well as they gained them through recitation.[32] With a three day experience in the Inter-Nation Simulation Lee and O'Leary found one month after the experience that high school students had the ability to function more effectively in complex, high-pressured,

and ambiguous decision-making environments. This result was in contrast to the control group. In reflecting on the simulation experience the students reported that this was its major strength as a learning experience. Results indicated that there was an increase in the students' tolerance of ambiguity--the game reduced student rigidities and, in general, made them more flexible. As a result of their experience in the simulation, the students also developed a greater sense of general confidence in their ability to make decisions and function well in these kinds of situations. The game experience did not seem to help students distinguish between "rough and pressured" decision-making vocations and non-decision-making vocations. There was also no significant effect on the measure of students' appreciation for the complexities and difficulties national leaders face in making decisions.[33]

In summary, simulation game research indicates that in general students respond with interest and motivation to games, that students learn content as well through games as they do through conventional methods, and that opinions and attitudes are sometimes changed through the vicarious experience of a simulation game. Findings dealing with the retention of learning are mixed. Problem-solving and decision-making skills are learned as well or better through simulation. Simulation games appear to teach winning strategies as well as knowledge of those strategies. However, whether or not this learning outcome is taught better by the simulation game method than by other educational approaches has yet to be determined.

The Differential Impact of Games

A number of investigators observed that individual variables are related to the differential learning effects of simulation games. The sex of subjects has been found to be related to differential effects by a number of

researchers.[34] Fletcher, Karweit and Livingstone, and Vinacke found a qualitative difference between the way males and females performed in a game, with the males outperforming the females. C. R. Anderson observed that the Consumer Game was a more effective classroom technique for teaching males some problem-solving skills than conventional classroom approaches. According to Stoll and McFarlane females developed a cooperative game strategy more readily than males in Parent-Child. With Life Career Game Boocock concluded that boys and girls empathized with game roles differently.

With the Parent-Child game McFarlane (1969) observed that there were differences between groups of white and black males in an elementary, inner-city school. The white children approached the rational norms of the game model more closely than did the black.[35] Boocock, Schild, and Stoll found that black high school students performed as well as their white counter-parts in two of the John Hopkins' games.[36] Whether or not the race of subjects is related to the differential learning impact of games has yet to be established.

The academic ability of students has been studied by a number of investigators in relationship to cognitive learnings, game performance, and game success. Fletcher observed that bright students in the elementary grades learned more cognitive material from the Caribou Games than did slow students, but there was no difference in their ability to play the game.[37] Game performance was also found to be unrelated to general academic work according to studies conducted by Cohen, Dill, Kuehn, and Winter and Inbar.[38] The opposite conclusion, however, was reached by McKenney and Dill with the Harvard Business School Management Simulation.[39] Braskamp and Hodgetts found that game success and grade-point average were unrelated in their research with Top Management Simulation.[40] Robinson, Anderson, Hermann, and Snyder concluded that college students who were better at fact-mastery than at grasping principles preferred

the case-study approach, while students who were interested in and could grasp general principles preferred the Inter-Nation Simulation.[41] C. R. Anderson observed that high school students majoring in business or general education learned the behavior of selecting a credit source better by playing Consumer Game than by conventional instruction. College preparatory majors learned as well by either approach.[42] With the Inter-Nation Simulation Lee and O'Leary discerned no differential learning or attitude-change effects related to average school grades. They observed that a number of students who were never active in regular classes took on important roles during the play of the simulation and became strong and effective speakers during the post-game sessions.[43]

Studies have demonstrated differential learning outcomes which are related to game performance. With the Consumer Game Zaltman observed that high borrowers were more likely to know the correct answers on a test of knowledge than those participants who borrowed less frequently.[44] Many students who played the Surfboard Game were able to predict the effect of a change in the number of production workers on total raw material costs; whereas, students who did not play the game were unable to make a correct prediction.[45] Karweit and Livingstone indicated that this learning was experienced directly in game play.[46] McKenney and Dill concluded that a subject's quality of performance in a game was directly related to his satisfaction with the learning experience.[47]

The age of subjects has been found to be related to differential effects by Zaltman and Chartier. With the Consumer Game adolescents participated more and learned more for any given level of participation than adults.[48] Undergraduates expressed more satisfaction with learning in Generation Gap than adults.[49]

In playing and discussing the Inter-Nation Simulation with a group of high school students Lee and O'Leary found that what the students believed about

the nature of man affected their learning experience. Students who had a simple faith in the goodness of people became quite disillusioned and wary about what occurs on the international scene. They came away from the game less convinced that the average man can have an influence on public affairs, more pessimistic about the future of international relations, and with more of a feeling that international negotiations should be conducted out in the open rather than on the basis of secret dealings and treaties. In general, these high school students turned away from the problems of international affairs. They withdrew interest; their orientation became more privatistic and narrow; they lost empathy for decision-makers, and they became more inclined to leave decision-making to leaders rather than to question their judgment. On the other hand, students who held no idealistic illusions about the nature of man went through a rather profound growth experience. They achieved greater maturity in their understanding of international relations; they developed a realistic empathy for decision makers. These students became more optimistic about the ability of people to change the larger world about them; they became more tolerant of ambiguities and uncertainties of the complexities of life. Finally, they came away from the game with a broader pattern of interests and concerns. These measurements taken a month after the game experience seem to indicate that simulation can induce profound personality changes.[50]

With business simulations studies have been conducted to investigate whether students with qualities of businessmen had greater success in games than other students. Vance and Gray in Management Decision Simulation and Van Slyke found that those who did well in a game had the same traits as businessmen in general.[51] Braskamp and Hodgetts in Top Management Simulation found no relationships between personality traits and game performance. However, they concluded that students who are most similar to manufacturing presidents did best in this game.[52]

In summary, variables investigated for differential impact on learning from simulation games have been sex, race, academic ability, game performance, age, beliefs about man, and businessmen qualities. The major variables related to differential effects have been sex and academic ability.

Learning Effects Related to Game Variables

A number of game variables have affected game learning. The size of the group playing a simulation game has affected participants' interest and what they were able to learn.[53] The comparative disorganization of some game sessions has bothered some students and affected the amount they could learn from the experience.[54] How a game was introduced influenced subjects' predisposition toward the game experience.[55] How satisfied a person was with the game experience depended upon the status of the role he was assigned.[56]

The way persons are assigned to a team seems to affect learning. McKenney and Dill with the Harvard Business School Management Simulation found that grouping participants so that they were homogeneous in ability or prior performance had serious drawbacks to productive learning. Forming teams which had obvious differences in game potential was especially detrimental to both satisfaction and performance.[57] Stoll and McFarlane observed in a study with Parent-Child that dyads, who were close friends prior to the game, found the initial role-playing experience difficult, but that friendship was conducive to developing the cooperative strategy desired by the game designers.[58]

The role of competition in games has been studied by Farran and McKenney and Dill.[59] The relationship between individuals competing against each other as opposed to one group competing against another group has been investigated by Farran with two of the John Hopkins' games. The players in the individual-competition form of the games performed better on the post-tests than the

those in the group-competition form of the games.[60] McKenney and Dill observed that game competition helped to motivate the players, but that it also tended to induce the use of conservative strategies by participants and thereby inhibited the learning potential of these subjects in the Harvard Business School Management Simulation.[61]

The role of game advisors and their impact upon learning effects has been studied by McKenney and Dill and Starbuck and Kobrow with two different business games.[62] With the Harvard Business School Management Simulation McKenney and Dill found that a faculty member served better as a critic of the role that students were trying to assume rather than as an active counselor telling students how to manage. With the UCLA Executive Decision Game Starbuck and Kobrow observed that unadvised teams made almost the same profits as the advised teams. The advisors found the game to be a good medium for teaching fundamental economic concepts. The imposition of advisors did, however, reduce the degree of perceived friendliness in the teams' interpersonal relations.

Fletcher has studied the effects of feedback and the difficulty of the game. He found that increasing the difficulty of the goal in the Caribou Games had only a marginal effect on the learning of elementary children. Reflecting on performance in the games through studying the feedback from previous plays significantly increased learning associated with the games. However, such study did not improve performance in the games or the knowledge of the best strategies in the game.[63]

In summary, a variety of game variables have been studied in relationship to learning effects. These variables include the size of groups, the organization of game sessions, the introduction to a game, the role and team assignment of subjects, the function of competition, the role of game advisors, the effects of feedback, and the difficulty of achieving the game goal.

Learning Effects Related to Combining Simulation Games with Other Learning Methodologies

A few studies have been done to explore the learning potential of combining games with other teaching methodologies. Thus far the research results point to the social-emotional effects. L. F. Anderson found that a combination of simulation and case studies produced more student interest than simulation or case studies used singly. However, Anderson observed that simulation without case studies produced more interest than case studies without simulation.[64] Chartier concluded that subjects who participated in a simulation game with discussion expressed more satisfaction with learning than subjects who participated in simulation without discussion, discussion without simulation, or neither (individual study). He was unable to discern that simulation alone was superior to discussion or individual study with regard to the affective outcome of satisfaction in response.[65] It is important to note that many studies with simulation games have failed to control for the impact of game discussion. Thus far simulation game research has considered the impact of combining simulation games with case studies and discussion.

## SUGGESTIONS FOR THE UTILIZATION OF SIMULATION GAMES

Following this summary of research findings what can be said for the learning impact of simulation games? How does this information relate to the utilization of simulation games by those who choose to use them in speech communication instructional settings?

1) As a device for motivating students, simulation games seem to be exceptionally effective. Teachers of speech communication can generate interest in their subject matter by involving students in the communication processes simulated in games.

2) Students seem to achieve cognitive objectives by participating

in simulation games as well as they would through other teaching-learning approaches, especially more conventional classroom activities. The mixed results on retention of learning as it relates to cognitive materials would seem to indicate that simulation games are about as effective as other methods in regard to retention, at least in general. Such findings should free teachers of speech communication from fears that games may be inferior cognitive tools. It should help them realize that games can be taken as seriously as lectures, discussion, recitation, case studies, individual study, etc. Games can be fun and yet effective tools for learning cognitive materials.

3) Simulation games teach students the winning strategy. In some games the use of speech communication is an important element in the winning strategy. For example, in Generation Gap the winning strategy calls for interpersonal cooperation between parent and teenager. This calls for rational communication and conciliatory language rather than the language of threat and punitive communication.[66]

4) Simulation games may influence a shift in student attitudes. The evidence here is quite mixed and certainly not a learning impact a teacher can count on merely because a simulation game can be used. Great claims have been made for the influence of simulation experiences upon student attitudes.[67] Such claims need to be taken with a certain amount of skepticism. Whether or not games influence attitudes probably depends upon the game, the degree of involvement in it, the students playing it, and what transpires in the post-game discussion. Teachers of speech communication need to consider attitudinal objectives when using simulation games, especially as to whether or not such objectives are realistic in the light of a given game.

5) Simulation games seem to be effective tools for teaching students decision-making and problem-solving skills. Teachers of small group communication have an opportunity to involve students in the processes of decision

making and problem solving through appropriate simulation games. Thus far the research seems to indicate that students learn these skills as well or better through simulation than through other teaching methods.

6) Simulation games have a way of reaching some students that other methods fail to accomplish. a) Boys and girls respond to games differently. In general boys seem to respond well to competitive games and learn through them. Girls seem to respond to cooperative games. In the speech communication classroom it is probably important to use both types of games so that students can learn through both experiences.

b) Academic ability seems to be unrelated to how well students perform in games. Success in simulation games seems to require behavior different from that needed in more conventional classroom settings. Students with low academic ability may very well do better in simulation games because they are highly motivated by this methodological approach. While students of speech communication may find some courses too abstract and theoretical, when simulation is employed they discover a concreteness and involvement that often generates a new enthusiasm for learning.

c) Adults seem to respond to games differently than young people. This finding is rather tentative and probably depends upon the game a teacher uses. However, a teacher of speech communication cannot assume that because a simulation has worked well in the high school or college classroom it will work as well in an adult communication workshop. Because of age, adults respond at a different level than younger students. Frequently, adults require more time to play a game than younger people.

d) Choosing games which fit the interests and personalities of students seems to facilitate their learning. Teachers of business and professional communication may find vocational simulations quite helpful in teaching

communication processes for these students.

7. The degree of involvement in the game performance seems to influence whether students learn certain behaviors and how they feel about the total experience. Games for speech communication need to be selected on the basis of whether or not they involve students in the processes of communication, especially processes that involve new behaviors for students. As students become involved in these processes, they seem to learn them and are satisfied with their learning experiences.

8. Group size affects learning and satisfaction with learning. In working with games it is important for the teacher of speech communication to think through maximum group size for effective learning. What size group will generate active involvement in the game experience?

9. Some students find it difficult to learn if the game experience appears disorganized. A teacher's thorough preparation is critical to having a successful learning experience through gaming.

10. Games need an appropriate introduction for students to be positively predisposed to them for learning. Students need to know the purpose of the game and why they are being asked to play it. They need an awareness of what is expected of them and what they can learn. An introduction need not be long, but it needs to be appropriate.

11. Role assignment can affect how satisfying a game experience is for a student. Role assignment frequently cannot be strictly controlled. If many games are used, teachers of speech communication need to provide students with an opportunity to play a variety of roles, particularly roles with varying status.

12. A general rule seems to be that teams for games should be hetergeneous for productive learning. The teacher will want to give some

thought to team composition. Classroom and friendship cliques need to be assigned to different teams, at least from time to time. Teams composed of friendship groups may be too homogeneous to produce a good simulation learning experience.

13. Competition in games seems to motivate involvement. Individual competition seems to be better for learning than group competition. Realizing that learning to work in task groups is an important learning outcome, the teacher of speech communication may want to use both.. One problem with competition is that players tend to use conservative strategies, thus inhibiting the learning of new behaviors. Noncompetitive games may facilitate exploratory behavior; however, there is no published research to validate this claim.

14. The role of game advisors should be to raise facilitative questions about students' game play. Leadership that is too dominant seems to inhibit the freedom of students to explore alternatives in game play and to inhibit the development of team cohesiveness. Games by design seem to be most effective as teaching-learning devices when teachers assume a facilitative role and maintain it. The teacher of speech communication should raise questions about player's communication strategies and about trying alternative strategies.

15. The goal of a game needs to be appropriately established for effective learning. Goals which are either too difficult or too easily obtained do little to contribute to learning.

16. In games that have feedback components on players' performance it is important for students to have opportunity to reflect upon the feedback to increase learnings. The teacher of speech communication will want to use his skills in questioning and group dynamics to facilitate this reflective process.

17. When games are used with other teaching-learning methodologies, students find them to be more interesting and satisfying as learning experiences.

Speech-communication teachers can interlink simulation games with theoretical data sessions, films, a variety of approaches to group discussion, case studies, and other action techniques.

Although simulation game research is in an infancy stage, it provides some possible indications as to the value of games in learning environments. For some purposes the potential of games seems to go beyond that of other teaching-learning methods. Because games involve students in dynamic social processes, they are particularly appropriate for courses in processes of speech communication.

FOOTNOTES

[1]William I. Gorden, "Academic Games in the Speech Curriculum," Central States Speech Journal, XX (Winter 1969), 269-279; Raymond K. Tucker, "Computer Simulations and Simulation Games: Their Place in the Speech Curriculum," The Speech Teacher, XVII (March 1968), 128-133.

[2]Speech Communication Association Convention Program 59th Annual Meeting (New York: Speech Communication Association, 1972), pp. 47, 59, 78-79.

[3]Jerry L. Fletcher, "The Effectiveness of Simulation Games as Learning Environments: A Proposed Program of Research," Simulation and Games, II (December 1971), 432-450; Dale M. Garvey, "Simulation: A Catalogue of Judgements, Findings, and Hunches," in Educational Aspects of Simulation, ed. P. J. Tansey (London: McGraw-Hill, 1971), pp. 209-226; John Raser, Simulation and Society (New York: Allyn and Bacon, 1969), pp. 114-136.

[4]Lee F. Anderson, "Combining Simulation and Case Studies in the Teaching of American Foreign Policy" (Evanston, Ill.: Northwestern University, 1964, mimeo); Sarane S. Boocock, "Effects of Election Campaign Game in Four High School Classes" (Baltimore, Md.: Center for the Study of Social Organization of Schools, John Hopkins University, 1963, mimeo); Sarane S. Boocock, "An Experimental Study of the Learning Effects of Two Games with Simulated Environments," American Behavioral Scientist, X (October 1966), 8-17; Sarane S. Boocock and James S. Coleman, "Games with Simulated Environments in Learning," Sociology of Education, XXXIX (Summer 1966), 215-236; Cleo H. Cherryholmes, "Developments in Simulation of International Relations in High School Teaching," Phi Delta Kappan, XLVI (January 1965), 227-231; Karen C. Cohen, "The Effects of Two Simulation Games on the Opinions and Attitudes of Selected Sixth, Seventh, and

Eighth Grade Students" (Baltimore, Md.: Center for the Study of Social Organizations of Schools, John Hopkins University, 1969, ERIC ED 031 766); Kalman J. Cohen, William R. Dill, Alfred A. Kuehn, and Peter R. Winters, The Carnegie Tech Management Game: An Experiment in Business Education. (Homewood, Ill.: Richard D. Irwin, Inc., 1964); Dale M. Garvey and William H. Seiler, "A Study of Effectiveness of Different Methods of Teaching International Relations to High School Students" (Emporia: Kansas State Teachers College, 1966, mimeo); Michael Inbar, "Development and Educational Use of Simulations: An Example 'the Community Response Game,'" Scientia Paedagogica Experimentalis, VI (January, 1969), 5-44; Michael Inbar, The Differential Impact of a Game Simulating a Community Disaster and its Implications for Games with Simulated Environments (Doctoral dissertation, John Hopkins University, Ann Arbor, Mich.: University Microfilms, 1966, No. 67-2997.); Robert S. Lee and Arlene O'Leary, "Attitude and Personality Effects of a Three-Day Simulation," Simulation and Games, II (September 1971), 309-347; James L. McKenney and William R. Dill, "The Effects of Team Assignment and Faculty Boards on Student Attitudes and Learning," in Simulation Games in Learning, eds. Sarane S. Boocock and Erling O. Schild (Beverly Hills, Ca.: Sage Publications, Inc., 1968), pp. 217-231; James A. Robinson, Lee F. Anderson, Margaret G. Hermann, and Richard C. Snyder, "Teaching with Internation Simulation and Case Studies," American Political Science Review, LX (May 1966), 53-65; Hall T. Sprague and R. Garry Shirts, "Exploring Uses of Classroom Simulations" (LaJolla, Ca.: SIMILE II, Western Behavioral Sciences Institute, 1966, mimeo); a study by Merle Loewen, cited in Garvey, "Simulation: A Catalogue of Judgements, Findings, and Hunches," pp. 213, 227.

[5]Boocock, "Effects of Election Campaign Game in Four High School Classes."

[6]Robinson, Anderson, Hermann, and Snyder, "Teaching with Internation Simulation and Case Studies."

[7]Lee and O'Leary, "Attitude and Personality Effects of a Three-Day Simulation."

[8]Garvey, "Simulation: A Catalogue of Judgements, Findings, and Hunches," p. 213.

[9]Charles R. Anderson, "An Experiment on Behavioral Learning in a Consumer Credit Game," Simulation and Games, I (March 1970), 43-54; Lee F. Anderson, "Combining Simulation and Case Studies in the Teaching of American Foreign Policy"; Boocock, "Effects of Election Campaign Game in Four High School Classes"; Sarane S. Boocock, Erling O. Schild, and Clarice S. Stoll, "Simulation Games and Control Beliefs" (Baltimore, Md.: The Center for the Study of Social Organization of Schools, John Hopkins University, 1967, mimeo); Myron R. Chartier, "Learning Effect: An Experimental Study of a Simulation Game and Instrumented Discussion," Simulation and Games, III (June 1972), 203-218; Cohen, Dill, Kuehn, and Winters, The Carnegie Tech Management Game; W. K. Hart, An Analysis of the Usefulness of Simulation Games in Affecting Attitudinal Changes and Skill-Type Learning (Doctoral dissertation, United States International University, Ann Arbor, Mich.: University Microfilms, 1969, no. 70-9803); Otto A. Heinkel, "Evaluation of Simulation as a Teaching Device," The Journal of Experimental Education, XXXVIII (Spring 1970), 32-36; Robinson, Anderson, Hermann, and Snyder, "Teaching with Internation Simulation and Case Studies," 53-65; Richard L. Wing, "Two Computer Based Games for Sixth Graders," American Behavioral Scientist, X (November 1966), 31-33.

[10]Wing, "Two Computer Based Games for Sixth Graders," 31-33.

[11]Garvey and Seiler, "A Study of Effectiveness of Different Methods of Teaching International Relations to High School Students."

[12]N. Karweit and Samuel A. Livingstone, "Group Versus Individual Performance and Learning in a Computer Game: An Exploratory Study" (Baltimore, Md.: Center for the Study of Social Organization of Schools, John Hopkins University,

1969, ERIC ED 032 789).

[13]Eugene H. Baker, "A Pre-Civil War Simulation for Teaching American History," in Simulation Games in Learning, eds. Boocock and Schild, pp. 135-142.

[14]Boocock, "An Experimental Study of the Learning Effects of Two Games with Simulated Environments," 8-17.

[15]Lee and O'Leary, "Attitude and Personality Effects of a Three-Day Simulation," 309-348.

[16]Wing, "Two Computer Based Games for Sixth Graders," 31-33; Garvey and Seiler, "A Study of Effectiveness of Different Methods of Teaching International Relations to High School Students."

[17]Baker, "A Pre-Civil War Simulation for Teaching American History," pp. 135-142.

[18]Chartier, "Learning Effect," 203-218.

[19]E. O. Schild, "The Shaping of Strategies," American Behavioral Scientist, X (November 1966), 1-4.

[20]Boocock, "An Experimental Study of the Learning Effects of Two Games with Simulated Environments," 8-17; Jerry L. Fletcher, "Evaluation of Learning in Two Social Studies Simulation Games," Simulation and Games, II (September 1971), 259-286; Inbar, The Differential Impact of a Game Simulating a Community Disaster and its Implications for Games with Simulated Environments.

[21]Schild, "The Shaping of Strategies," 1-4.

[22]Paul DeKock, "Simulations and Changes in Racial Attitudes," Social Education, XXXIII (February 1969), 181-183.

[23]Boocock, "Effects of Election Campaign Game in Four High School Classes"; Cherryholmes, "Developments in Simulation of International Relations in High School Teaching," 227-231; Karen C. Cohen, "The Effects of Two Simulation Games on the Opinions and Attitudes of Selected Sixth, Seventh, and Eighth Grade

Students"; Hart, An Analysis of the Usefulness of Simulation Games in Affecting Attitudinal Changes and Skill-Type Learning; Heinkel, "Evaluation of Simulation as a Teaching Device," 32-36.

[24]Garvey and Seiler, "A Study of Effectiveness of Different Methods of Teaching International Relations to High School Students."

[25]Boocock, "An Experimental Study of the Learning Effects of Two Games with Simulated Environments," 8-17.

[26]Heinkel, "Evaluation of Simulation as a Teaching Device," 32-36.

[27]Hart, An Analysis of the Usefulness of Simulation Games in Affecting Attitudinal Changes and Skill-Type Learning.

[28]Gerald Zaltman, "Degree of Participation and Learning in a Consumer Economics Game," in Simulation Games in Learning, eds. Boocock and Schild, pp. 205-215.

[29]Lee and O'Leary, "Attitude and Personality Effects of a Three-Day Simulation," 309-348.

[30]Philip M. Burgess and James A. Robinson, "Political Science Games and the Problem-Solver State," in Simulation Games in Learning, eds. Boocock and Schild, pp. 243-249; Raser, Simulation and Society, p. 128; Paul A. Twelker, "Simulation: An Overview," in Instructional Simulation: A Research Development and Dissemination Activity, ed. Paul A. Twelker (Monmouth: Teaching Research, Oregon State System of Higher Education, 1969), p. 59; Barbara B. Varenhorst, "The Life Career Game: Practice in Decision-Making," in Simulation Games in Learning, eds. Boocock and Schild, pp. 251-254.

[31]Charles R. Anderson, "An Experiment on Behavioral Learning in a Consumer Credit Game," 43-54.

[32]Garvey and Seiler, "A Study of Effectiveness of Different Methods of Teaching International Relations to High School Students."

[33]Lee and O'Leary, "Attitude and Personality Effects of a Three-Day Simulation," 309-348.

[34]Charles R. Anderson, "An Experiment on Behavioral Learning in a Consumer Credit Game," 43-54; Boocock, "An Experimental Study of the Learning Effects of Two Games with Simulated Environments," 8-17; Fletcher, "Evaluation of Learning in Two Social Studies Simulation Games," 259-287; Karweit and Livingstone, "Group Versus Individual Performance and Learning in a Computer Game"; Clarice S. Stoll and Paul T. McFarlane, "Player Characteristics and Interaction in a Parent-Child Simulation Game," Sociometry, XXXII (September 1969), 259-272; W. E. Vinacke, "Negotiations and Decisions in a Politics Game," (Nohr 4374 (00), Technical Report No. 13, Office of Naval Research, Buffalo, N.Y.: State University of New York at Buffalo, 1968).

[35]Paul T. McFarlane, "Pilot Studies of Role Behaviors in a Parent-Child Simulation Game" (Baltimore, Md.: Center for the Study of Social Organization of Schools, John Hopkins University, 1969, mimeo).

[36]Boocock, Schild, and Stoll, "Simulation Games and Control Beliefs."

[37]Fletcher, "Evaluation of Learning in Two Social Studies Simulation Games," 259-287.

[38]Cohen, Dill, Kuehn, and Winters, The Carnegie Tech Management Game: Inbar, "Development and Educational Use of Simulations," 5-44.

[39]McKenney and Dill, "The Effects of Team Assignment and Faculty Boards on Student Attitudes and Learning," pp. 217-231.

[40]Larry A. Braskamp and Richard M. Hodgetts, "The Role of an Objective Evaluation Model in Simulation Gaming," Simulation and Games, II (June 1971), 197-212.

[41]Robinson, Anderson, Hermann, and Snyder, "Teaching with Internation Simulation and Case Studies," 53-65.

[42]Charles R. Anderson, "An Experiment on Behavioral Learning in a Consumer Credit Game," 43-54.

[43]Lee and O'Leary, "Attitude and Personality Effects of a Three-Day Simulation," 309-348.

[44]Zaltman, "Degree of Participation and Learning in a Consumer Economics Game," pp. 205-215.

[45]Karweit and Livingstone, "Group Versus Individual Performance and Learning in a Computer Game."

[46]Ibid.

[47]McKenney and Dill, "The Effects of Team Assignment and Faculty Boards on Student Attitudes and Learning," pp. 217-231.

[48]Zaltman, "Degree of Participation and Learning in a Consumer Economics Game," pp. 205-215.

[49]Unpublished study by Myron R. Chartier, 1971.

[50]Lee and O'Leary, "Attitude and Personality Effects of a Three-Day Simulation," 309-348.

[51]Stanley C. Vance and Clifford F. Gray, "Use of a Performance Evaluation Model for Research in Business Gaming," Academy of Management Journal, X (March 1967), 27- 37; M. D. Van Slyke, "Psychological Correlates of Business Game Performance and Managerial Success" (M.A. thesis, Purdue University, 1964).

[52]Braskamp and Hodgetts, " The Role of an Objective Evaluation Model in Simulation Gaming," 197-212.

[53]Bernard C. Cohen, "Political Gaming in the Classroom," Journal of Politics, XXIV (May 1962), 367-381; Inbar, "Development and Educational Use of Simulations," 5-44; Inbar, The Differential Impact of a Game Simulating a Community Disaster and its Implications for Games with Simulated Environments; Vinacke, "Negotiations and Decisions in a Politics Game."

[54]Boocock, "Effects of Election Campaign Game in Four High School Classes"; Cohen, Dill, Kuehn, and Winter, The Carnegie Tech Management Game; Inbar, "Development and Educational Use of Simulations," 5-44.

[55]Inbar, The Differential Impact of a Game Simulating a Community Disaster and its Implications for Games with Simulated Environments.

[56]Cohen, Dill, Kuehn, and Winter, The Carnegie Tech Management Game.

[57]McKenney and Dill, " The Effects of Team Assignment and Faculty Boards on Student Attitudes and Learning," pp. 217-231.

[58]Stoll and McFarlane, "Player Characteristics and Interaction in a Parent-Child Simulation Game," 259-272.

[59]Dale C. Farran, "Competition and Learning for Underachievers," in Simulation Games in Learning, eds. Boocock and Schild, pp. 191-203; McKenney and Dill, "The Effects of Team Assignment and Faculty Boards on Student Attitudes and Learning," pp. 217-231.

[60]Farran, "Competition and Learning for Underachievers," pp. 191-203.

[61]McKenney and Dill, "The Effects of Team Assignment and Faculty Boards on Student Attitudes and Learning," pp. 217-231.

[62]Ibid.; William H. Starbuck and Ernest Kobrow, "The Effects of Advisors on Team Performance," in Simulation Games in Learning, eds. Boocock and Schild, pp. 232-239.

[63]Fletcher, "Evaluation of Learning in Two Social Studies Simulation Games," 259-287.

[64]Lee F. Anderson, "Combining Simulation and Case Studies in the Teaching of American Foreign Policy.

[65]Chartier, "Learning Effect," 203-218.

[66]Sarane S. Boocock and E. O. Schild, Generation Gap (New York: Western Publishing Co., Inc., 1969).

[67]Dale M. Garvey, "Simulation: A Catalogue of Judgements, Findings, and Hunches," pp. 213-217.